ONTARIO AGRICULTURAL COLLEGE

EXPERIMENT STATION

BULLETIN LXXII

ROOTS, POTATOES AND FODDER CORN.

BY THOMAS SHAW, PROFESSOR OF AGRICULTURE, AND
C. A. ZAVITZ, B. S. A., EXPERIMENTALIST.

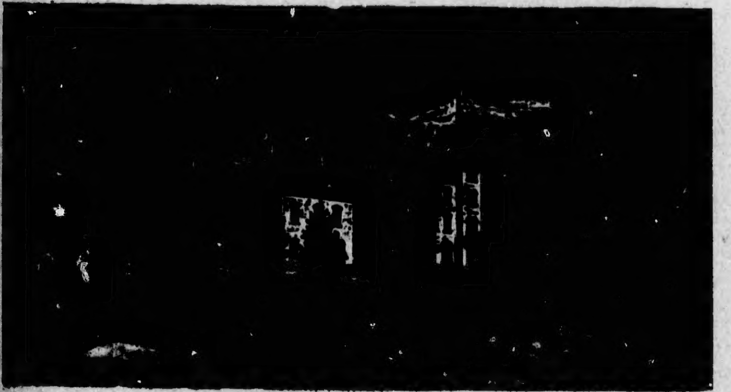
PUBLISHED BY THE DEPARTMENT OF AGRICULTURE
February 29, 1892

TORONTO
PRINTED BY WARWICK & SONS

MINISTER OF AGRICULTURE

HON. JOHN DRYDEN, TORONTO.

Ontario Agricultural College and Experimental Farm, Guelph, under control of the Minister of Agriculture.



James Mills, M.A.	**President.**
Thomas Shaw	**Professor of Agriculture and Farm Superintendent.**
A. E. Shuttleworth, B.A. Sc.	**Professor of Chemistry.**
J. Hoyes Panton, M.A., F.G.S.	**Professor of Natural History and Geology.**
F. C. Grenside, V.S.	**Professor of Veterinary Science.**
H. H. Dean, B.S.A.	**Professor of Dairy Husbandry.**
E. Lawrence Hunt, B.A.	**Assistant Resident and Mathematical Master.**
Captain Walter Clarke	**Instructor in Drill and Gymnastics.**
C. A. Zavitz, B.S.A.	**Experimentalist.**
H. B. Sharman, B.S.A.	**Assistant Chemist.**
A. McCallum,	**Bursar.**

ADVISORY BOARD.

C. C. James, M.A., *Secretary*	**Deputy Minister of Agriculture, Toronto.**
John I. Hobson, *Chairman*	**Mosborough, County of Wellington.**

BULLETIN LXXII.

ROOTS. POTATOES AND FODDER CORN.

Experience has taught our farmers that there is a tendency with all kinds of grain to deteriorate when grown for several years in the same locality, hence the necessity for the introduction of new varieties from time to time. The same holds true of field roots, potatoes and corn, hence the necessity will always exist for conducting experiments which will enable us to determine which of these varieties are worthy of the attention of the agriculturist.

The following include some of the principal objects of this bulletin, viz.:—(1) To give the comparative results obtained from growing leading varieties of roots, potatoes and fodder corn side by side, and under the same conditions, for one year, and in the case of some of them for a longer term; and (2) to give the comparative results from growing roots (*a*) upon ridges as against flat cultivation, and (*b*) upon rows at different distances apart.

In 1891, 57 varieties of turnips, 36 of mangels and 4 of sugar beets were grown at this station and upon plots side by side. Each plot consisted of two drills 6 rods in length. The soil was a clay loam of mild texture. It had produced grain crops for a number of years previously, was manured with a fair dressing of stable manure in the spring of 1890, and produced a crop of rape the same autumn which was pastured off on the land. The seeds of nearly all the varieties of roots tested were obtained from seedsmen in Ontario and the United States, but a few were also obtained from England.

Swede Turnips. 42 varieties were grown. The drills were 27.3 inches apart. In one drill the plants were thinned to a distance of 12 inches and in the other to 16 inches. They were sown June 19th. The following table gives the comparative results from the 6 varieties which gave the highest yields:

Varieties.	Description of roots.		Average weight per root of two seedings.	Average yield per acre.
	Shape.	Firmness of flesh.		
			lb.	tons.
Hartley's Bronze top.......	long ..	good	2.91	23.93
Marshall's Purple top	globe...	good	2.91	23.77
Sutton's Champion	globe...	medium..	2.95	23.54
Hazard's Swede turnip.....	long ..	good	2.91	23.12
Our selected Purple top	long ..	poor	2.89	22.96
Skirving's Swede	globe...	good	2.76	22.73

The following varieties have given the best yields for two years, viz.: Royal Norfolk Purple Top, 21.15 tons per acre, Hazard's Swede 20.92, and Carter's Elephant 19.87 tons. The average yield of all the Swedish varieties grown in 1891 was 19.7 tons.

White Fleshed and Yellow Fleshed Turnips. 15 varieties were grown. The drills were 27.2 inches apart. In one drill the plants were thinned to 16 inches and in the other to 13 inches in the row. They were sown June 19th. These varieties are all white fleshed. The comparative results from the six varieties which gave the highest yields are shown below.

Varieties.	Shape of roots.	Average weight per root of two seedings.	Average yield per acre.
		lb.	tons.
Grey Stone Improved		4.29	29.28
Red Globe Norfolk	globe	3.67	28.69
Jersey Navet	"	3.74	28.23
Grey Stone	"	3.56	28.08
Purple Top Main	slightly flat	3.48	26.09
Red Top Strap Leaf	flat	3.15	25.97

The following varieties have given the best yields for two years, vis: Red Globe Norfolk, 27.6 tons per acre, Red Top Strap Leaf, 23.3 tons, and Pomeranian White Globe, 22 tons. These also are all white fleshed varieties. The 11 white fleshed varieties averaged 25.6 tons per acre, and the four yellow fleshed 20.22 tons.

Mangels. 36 varieties were grown. The drills were 22½ inches apart. In one drill the plants were thinned to 7 inches and in the other to 14 inches. They were sown May 23rd. The next table gives the comparative results from the six varieties which gave the highest yields.

Varieties.	Shape.	Uniformity.	Average weight per root of two seedings.	Average yield per acre.
			lb.	tons.
Improved Mammoth Prize, long red	long	even	2.55	35.56
Carter's Champion	half long.	"	2.77	34.09
Mammoth Sawlog	long	"	2.68	34.00
Steele Bros. Long Red Selected	"	medium	2.61	33.33
Norbitan Giant	"	"	2.59	32.07
Eiffel Tower	half long.	"	2.46	32.04

It will be observed that these do not comprise any of the globe varieties. The highest yielding globe variety came 18th in the list. The 14 distinctively long varieties yielded an average of 28.57 tons per acre and the six globe varieties an average of 22.42 tons. The following varieties have given the best yields per acre for two years, viz: Norbitan Giant 22.9 tons, Long Red 19.3 tons and Carter's Warden Orange 18.3 tons.

Sugar Beets. 4 varieties were grown. The drills were 22½ inches apart. In one drill the plants were thinned to 6 inches in the row, and in the other to 12 inches. They were sown May 23rd.

Varieties.	Average weight per root.	Yield per acre.
	lb.	tons.
Vilmorin's Improved White..	2.02	21.30
German White	1.64	20.71
Silesian	1.53	20.59
French White	1.42	16.87

It will be observed that the German White, the kind which has been grown most extensively over the province, comes second on the list in point of yield. The average yield of the four varieties is 19.86 tons per acre.

Potatoes. 74 varieties were grown in 1891, and 25 varieties for the two years past. The seed was obtained from the United States, the maritime provinces and Ontario. The soil was a clay loam containing a large amount of vegetable matter. It lay in sod for five years, was turned over last autumn and was thoroughly cultivated in the spring. One peck of the tubers of each variety was cut into 180 sets and planted in drills 28½ inches apart. The rows were 181½ ft. long.

Results from the six varieties which gave the highest yields:

Varieties.	Maturity. 1891.	Uniformity of tubers. 1891.	Average yield per acre. 1890-91.
			bush.
Empire State	medium	good	192.9
Summit.....	late	good	147.3
Early Maine..............	early.	medium	140.9
Clark No. 1	medium	good	138.0
Pootaluck	medium	good	130.3
Thorburn	medium	good	129.2

By actual test we have found all these varieties to possess good edible qualities with the exception of the Pootaluck, which probably should not be classed higher than medium.

Fodder Corn. 84 varieties were grown in 1891. The seed was obtained chiefly from the northern States, but some of it came from the southern States and some was obtained from Ontario. All these varieties were grown in duplicate in the first instance upon sod which had not been plowed for six years, and in the second on land which had grown different kinds of grain for four years previously. The sod was turned under in the autumn of 1890. No manure was applied nor had it received any since 1886. The stubble land was also plowed the previous autumn, and had received a fair application of farmyard manure in the spring of 1890. The soil was a mild clay loam and rather low lying. The corn was planted in hills, 5 links or 39.6 inches apart each way. But one row of each variety was planted on each kind of soil. The rows were 165 ft. long on the sod, and 99 ft. long on the stubble ground. But four plants were left in each hill. Thorough shallow cultivation was given the rows both ways. Following are the results:

Varieties.	Class of corn.	Maturity.	Weight of green ears per acre, 1891.	Average yield per acre of the whole crop, 1889-90-91.
			lb.	tons.
Sheep's Tooth	White dent ..	Late	1,966	16.62
Chester County Mammoth..	Yellow dent .	Late	1,800	16.41
Calico Dent	Mixed dent ..	Medium	4,333	15.25
Leaming Dent..............	Yellow dent .	Medium late..	3,866	15.28
Cranberry White Dent......	White dent ..	Late	900	15.10
Compton's Early	Yellow flint..	Early	6,000	15.03
Wisconsin Yellow Dent	Yellow dent .	Medium late..	3,166	14.94
Mammoth Southern Sweet..	White dent ..	Late	1,060	14.85
South Western	White dent ..	Late	1,700	14.62
Wisconsin White Flint	White flint...	Medium......	5,785	14.55

It should be remembered that these varieties were grown for fodder purposes whether in the green or dried state or cured in the silo. Eight of the ten varieties were dent and two were flint. It has been found somewhat difficult hitherto to get flint varieties which produce sufficient weights per acre, but this experiment shows that the two flint varieties named in the table weigh well and also produce a large quantity of grain. Of the other varieties the most suitable probably for the silo in temperatures the same as at this station are Compton's Early, Wisconsin White Flint, Leaming Yellow, and Wisconsin Yellow Dent.

The next table gives the comparative results obtained from growing Swede turnips, mangels, and sugar beets upon ridged drills as against flat cultivation. Each result mentioned in the table is the average of triplicate tests.

Modes of cultivation.	Average yield per acre (tons).		
	Swede turnips.	Mangels.	Sugar beets.
Flat cultivation	26.06	21.55	13.02
Ridged cultivation	25.83	19.52	12.91

It will be observed that the largest yield in each instance was obtained from the roots grown upon the level surface, and it is most marked in the case of the mangels.

The next table shows the comparative average yields per acre of Swede turnips, mangels and sugar beets grown in rows, 16, 24 and 28 inches apart. The turnips were thinned to the distance of 14 inches in the rows, the mangels 14 inches, and the sugar beets 7 inches. The mangels and sugar beets were sown on May 20th, and the turnips on June 22nd.

Distance between rows.	Average yield per acre (tons).		
	Swede turnips.	Mangels.	Sugar beets.
16 inches....................	27.39	24.05	14.03
24 inches....................	26.66	21.15	13.36
28 inches....................	23.78	16.42	11.51

It will be observed that those with the shortest distances between them gave the highest yields in every instance, but further tests will be required before conclusions can be drawn which can be followed with safety.

Conclusions.

The following conclusions may be safely drawn from the different experiments summarised in the Bulletin :

1. That while the average yield of the 11 varieties of white-fleshed turnips per acre was 853 bushels, that of the 4 yellow-fleshed varieties was but 673.3 bushels.

2. That while the average yield of the 14 distinctively long varieties of mangels was 952 bushels per acre, that of the 6 globe varieties was but 747 bushels.

3. That the best yielding varieties of potatoes tested at this station for the past two years are also possessed of good edible qualities.

4. That for quantity and quality of fodder and earliness in maturing the Compton's Early, Wisconsin White Flint, Leaming Yellow and Wisconsin Yellow Dent are probably the most suitable for the silo among the 35 varieties tested here for the past three years.

5. That in this test the mangels grown on the level gave 10.4 per cent. more of an increase than when grown on ridges, while the difference with the turnips and sugar beets was but slight.

Distribution of Seed. Parties desirous of obtaining seed of any of the leading varieties of field roots and corn grown at this station, for purposes of testing, should apply for circular, which contains all necessary information in reference to this department of the work of our Station.